

## CHAPTER 5

# Flight Rules

### 5.1 GENERAL FLIGHT RULES

**5.1.1 Aircraft Lighting.** Except when the nature of operations requires different lighting displays (i.e., formation flight, aerial refueling, carrier operations, night vision device (NVD) operations, FCLP pattern, emergency signals, etc.) or the model aircraft configuration precludes compliance, the following rules shall apply.

#### Note

Flight operations with NVDs are specifically addressed in paragraph 5.7.

**5.1.1.1 Position Lights.** Standard position lights shall be displayed during the period 30 minutes before official sunset until 30 minutes after official sunrise or at any time when the prevailing visibility as seen from the cockpit is less than 3 statute miles. During these conditions, they shall be displayed:

- a. Immediately before engine start and anytime the engine(s) is running.
- b. When the aircraft is being towed unless the aircraft is otherwise illuminated.
- c. When an aircraft is parked and likely to cause a hazard unless the aircraft is otherwise illuminated or marked with obstruction lights.

**5.1.1.2 Anti-collision Lights.** Anti-collision lights shall be used immediately before engine start and at all times when the aircraft engine(s) is in operation, except when the use of such lights adversely affects ground operations (i.e., arming and dearming, refueling operations, etc.). They may be turned off during flight through clouds when the rotating light reflects into the cockpit. The use of green anti-collision lights for the specific purpose of identifying

airborne tankers is authorized, provided that standard position lights are also displayed.

**5.1.1.3 Landing/Taxi Lights.** The use of landing/ taxi lights is an effective means of illuminating surface hazards during taxi movements at night and alerting all concerned of an aircraft's presence/ position in flight. Landing/taxi lights should be utilized for all taxi movements ashore during the hours of darkness unless a taxi signalman is directing the aircraft. Use of those lights during landing approaches (both day and night) within class B, C, or D airspace is recommended when meteorological conditions permit.

#### Note

- Good judgment should be exercised to avoid blinding pilots of other aircraft that are either airborne or on the ground.
- Use of landing/taxi lights is recommended in areas of high bird concentration.

**5.1.1.4 Formation Flight Lighting.** To the extent necessary for safety, lighting configuration for formation flights may be varied according to aircraft model and mission requirements. Normally, all aircraft in the flight shall have external lights on and at least one aircraft in the flight shall have lights on bright and the anti-collision light on when aircraft lighting is required.

#### Note

Aircraft engaged in drug interdiction operations are granted relief from FAR 91.209(a) provided each operation is conducted using a dedicated on-board observer, electronic/radar equipment, or an observer in a spotter aircraft, all of which must be capable of detecting

ing the presence of other aircraft operating in proximity to the interdiction aircraft and alerting the pilot to those aircraft locations. Additionally, interdiction aircraft will be required to operate the aircraft position lights to the maximum extent possible when instructed by ATC and will be authorized to operate without lights only when necessary to avoid detection by illegal elements.

**5.1.2 Right-of-Way Between Single and Formations of Aircraft.** When a single naval aircraft is converging with an aircraft formation at approximately the same altitude (except head-on, or nearly so), the formation flight has the right of way. In other cases, the formation shall be considered as a single aircraft and the right-of-way rules of FAR 91.113 apply.

**5.1.3 Unusual Maneuvers Within Class B, C, or D Airspace.** Pilots shall not perform or request clearance to perform unusual maneuvers within class B, C, or D airspace if such maneuvers are not essential to the performance of the flight. ATC personnel are not permitted to approve a pilot's request or ask a pilot to perform such maneuvers. Unusual maneuvers include unnecessary low passes, unscheduled fly-bys, climbs at very steep angles, practice approaches to altitudes below specific minimums (unless a landing is to be made), or any so-called flat hatting wherein a flight is conducted at a low altitude and/or a high rate of speed for thrill purposes.

#### **5.1.4 Aircraft Speed**

**5.1.4.1 FAR 91.** To reduce midair collision hazards associated with high aircraft speeds at low altitudes, FAR, Part 91.117, imposes a maximum airspeed limitation of 250 knots indicated airspeed (KIAS) on all aircraft operating below 10,000 feet mean sea level (MSL) in airspace where FAR, Part 91, applies and a maximum of 200 KIAS for aircraft operating: (1) at or below 2,500 feet above the surface within 4 nm of the primary airport of a Class C or D airspace area, or (2) in the airspace underlying a Class B airspace area designated for an airport or in a VFR corridor designated through such a Class B airspace area. The regulation grants exception for operations that cannot safely be conducted at airspeeds less than the prescribed maximum airspeed. The FAA has authorized the DOD to exceed 250

KIAS below 10,000 feet MSL for certain military requirements.

#### **Note**

Aircraft engaged in drug interdiction operations are exempted from the general speed limit of 250 knots below 10,000 feet MSL. However, pilots of aircraft so involved are required to establish and maintain two-way radio communication with the tower prior to entering the class B, C, or D airspace and, unless otherwise authorized by ATC, avoid the traffic patterns for any airport in class B, C, or D airspace.

**5.1.4.2 Policy.** In accordance with FAA authorization, flight operations below 10,000 feet MSL at an indicated airspeed in excess of 250 knots are authorized under the following conditions:

- a. Within restricted areas.
- b. Within military operations areas.
- c. When operating on DOD/FAA mutually developed and published routes.
- d. When operating on DOD-developed and DOD-published VR routes. Such routes shall be established for specific missions and used only by designated units when the provisions of a through c above will not accommodate the required national defense mission. Routes shall be developed and published in accordance with DOD/FAA mutually developed criteria.
- e. When operating within large-scale exercises or on short-term special missions approved by commanders listed in paragraph 5.1.4.3. Such exercises or missions may be authorized provided that coordination is effected to ensure awareness on the part of the nonparticipating flying public.
- f. If the airspeed required or recommended in the aircraft NATOPS manual to maintain safe maneuverability is greater than the maximum speed described in FAR, Part 91.117, the aircraft may be operated at that speed. Where the required or recommended speed is given as a range, the lower part of the speed range consistent with good oper-

ating practice should be used. The primary purpose of this provision is to accommodate climbs, descents, and terminal area operations and shall not be used to circumvent the provisions of subparagraphs above. Under no circumstance will this safe maneuverability provision be construed as authorization for individual pilots or mission commanders to conduct other flights below 10,000 feet in excess of 250 knots.

**5.1.4.3 Approval Authority.** Approval Authority for 5.1.4.2e is as follows: CMC; COMNAVAIR-PAC; COMNAVAIRLANT; COMMARFORPAC; COMMARFORLANT; CNATRA; COMNAVAIRESFOR; CG FOURTH MAW; or COMNAVAIRSYSCOM, as appropriate. Such operations may be approved providing full consideration is given to mission requirements and the safety of non-participating aircraft. The above commanders must review and approve each route established in accordance with paragraphs 5.1.4.2c and 5.1.4.2d within respective areas of responsibility. Coordination will be effected with the appropriate NAVREP at the FAA Regional Office to ensure that notice to the aviation public is provided.

#### Note

When an altitude below 10,000 feet MSL is assigned to aircraft requiring a higher operating speed for safe maneuverability, as indicated in the NATOPS manual for that aircraft, the pilot shall notify the controlling ATC facility of that higher minimum speed.

### 5.1.5 Special Use Airspace

- a. When operating within Special Use Airspace (SUA), ATC Assigned Airspace (ATCAA), or altitude reservations (ALTRVs), flights shall be conducted under the prescribed operational area procedures appropriate to the airspace area and mission/operation. Procedures and separation standards may be contained in a letter of agreement between the FAA and the military, or other applicable military or FAA directives.
- b. Military Assumes Responsibility for Separation of Aircraft (MARSA) may be applied between military aircraft as specified by letter of agreement or other appropriate military and FAA documents.

However, MARSA may not be invoked by individual aircraft or between flights of aircraft.

#### Note

- It is of the utmost importance that aircraft operating independently or under the control of a ground, ship, or airborne controller remain within the specified vertical and horizontal limits of assigned airspace. Remaining within assigned airspace can only be achieved by maintaining a total awareness of details depicted in current charts, publications, and military directives, coupled with a continual assessment of the accuracy of the controlling agency's radar. It may be required to operate with self-imposed vertical and horizontal buffers to remain within assigned airspace.
- When operating in designated SUA, aircrews should be aware that civilian aircraft may not honor the existence of such areas, nor monitor radio frequencies to receive appropriate warning/advisories.

### 5.1.6 Military Training Routes (MTRs)

#### 5.1.6.1 General

- a. MTRs have been developed to accommodate high-speed, low-level tactical training in excess of 250 KIAS. Operations shall be conducted at the minimum airspeed compatible with mission requirements. General information concerning MTRs is contained in OPNAVINST 3722.33 (FAA Order 7610.4, Special Military Operations). Specific route information is contained in FLIP AP/1B (Military Training Routes). Safety of flight is of prime consideration during all phases of low-altitude training.
- b. MTRs that include one or more segments above 1,500 feet AGL are identified by a three-digit identifier; those with no segment above 1,500 feet AGL are identified by four digits.
- c. Flight operations conducted along these routes or segments of these routes shall conform to the

direction of traffic flow indicated in the route description.

### **5.1.6.2 Preflight Planning**

a. Low-altitude, high-speed navigation training can be safely conducted by the execution of carefully planned flights. It is the responsibility of each crewmember to maintain professionalism in low-level operations and exercise a thorough knowledge of MTRs and operating constraints to ensure safe and meaningful training.

b. Low-level flying requires extensive preflight planning. A thorough review of FLIP AP/1B, temporary route advisories, Chart Updating Manual (CHUM), and Chart Updating Manual Supplement (CHUMSUPP) is essential to ensure flight safety and maximum training from each sortie. Check with the scheduling agency for unpublished restrictions and low-altitude charts for airspace restrictions.

c. A 1:500,000 scale chart, current tactical pilotage chart (TPC) or sectional aeronautical chart, should be used for flying low-level navigation.

d. Review the route corridor to identify all significant obstacles and high terrain. Note the avoidance criteria for airfields and the need to remain clear of published noise-sensitive areas.

e. Compute a route abort altitude. This altitude shall provide obstruction clearance. Aircrew must be aware of route structure.

### **5.1.6.3 Operating Procedures**

#### **5.1.6.3.1 General**

a. Unless otherwise delineated in a MTRs special operating procedures, aircrew shall avoid charted, uncontrolled airports by 3 nm or 1,500 feet.

b. Aircrew shall avoid Class B, C and D airspace.

c. Aircrew shall minimize disturbance to persons/property on the ground.

d. All route entries shall be accomplished at published entry/alternate entry points only.

e. Adherence to scheduled entry times provides for safe separation from other aircraft on the route or aircraft on conflicting/crossing routes.

f. Pilots shall be responsible for remaining within the confines of the published route width and altitude. If in an emergency it should become necessary to exceed the route parameters, the 250-knot speed restriction of FAR 91.117 applies.

#### **g. MTR Segment Transition**

(1) Pilots transitioning from one MTR segment to another segment with a lower minimum altitude must cross the fix defining the next leg no lower than the preceding segments minimum altitude. Example: "05 AGL B 15 AGL to "E" 02 AGL B 15 AGL to ..." indicates "E" must be crossed no lower than 500 feet AGL.

(2) Pilots transitioning from one MTR segment to another segment with a higher minimum altitude must cross the fix defining the next leg no lower than the subsequent segments minimum altitude. Example: "02 AGL B 15 AGL to "B" 10 AGL B 15 AGL to ..." indicates "B" must be crossed no lower than 1,000 feet AGL.

(3) Pilots transitioning from one MTR segment to another segment with a lower maximum altitude must cross the fix defining the next leg no higher than the subsequent segments maximum altitude. Example: "10 AGL B 60 MSL to "D" 02 AGL B 15 AGL to ..." indicates "D" must be crossed no higher than 1,500 feet AGL.

(4) Pilots transitioning from one MTR segment to another segment with a higher maximum altitude must cross the fix defining the next leg no higher than the preceding segments maximum altitude. Example: "10 AGL B 40MSL "B" 02 AGL B 70 MSL to ..." indicates "B" must be crossed no higher than 4,000 feet MSL.

h. Pilots shall be responsible for adhering to the provisions of FAR 91.119 (Minimum Safe Altitude, General).

i. All route exits shall be accomplished at published exit/alternate exit points only.

j. When exiting an MTR below 10,000 feet MSL, the flight shall comply with FAR 91.117 (Aircraft Speed).

### 5.1.6.3.2 IR Procedures

- a. All IFR Military Training Route (IR) operations shall be conducted on IFR flight plans.
- b. Pilots shall be responsible for obtaining a specific ATC entry clearance from the appropriate ATC facility prior to entering an IR route.
- c. Contour flight on IRs is outlined in FLIP AP/1B. Refer to Terrain Following Operation entry for applicable IR routes.
- d. Pilots shall be responsible for obtaining an IFR ATC exit clearance prior to exiting an IR route.

### 5.1.6.3.3 VR Procedures

- a. Flight plan requirements for VFR Military Training Route (VR) usage:
  - (1) Pilots departing on IFR clearances to fly VRs are required to file to the fix/radial/distance of their route entry/alternate entry point.
  - (2) Pilots transitioning to IFR upon exiting a VR are required to have on file a previously filed IFR flight plan from the appropriate fix/radial/distance of their exit point.
- b. Operations on VRs shall be conducted only when the weather is at or above VFR minimums except that:
  - (1) Flight visibility shall be 5 miles or more and
  - (2) Flights shall not be conducted below a ceiling of less than 3,000 feet AGL.
- c. For VR routes, the nearest Flight Service Station will be notified (255.4 MHz) by the pilot upon entering the route with: entry time, number/type aircraft, exit fix and estimated exit time.
- d. Pilots of aircraft operating on a VR route will adjust their transponder to code 4000 unless otherwise assigned by ATC.

### 5.1.6.4 Communication Failure

- a. If the failure occurs in VMC, or if VMC are encountered after the failure, each pilot shall con-

tinue the flight VFR and land as soon as practical. Refer to FAR 91.185b and DOD FLIP Flight Information Handbook.

- b. If the failure occurs in IMC or if paragraph a above cannot be complied with, each pilot shall:

- (1) Maintain to the exit/alternate exit point the higher of the following:

- (a) The minimum IFR altitude for each of the remaining route segment(s)
- (b) The highest altitude assigned in the last ATC clearance.

- (2) Depart the exit/alternate exit point at the altitude determined in (1) above, then climb/descend to the altitude filed in the flight plan for the remainder of the flight.

- c. Adjust transponder to reply on Mode 3/A Code 7600.

**5.1.6.5 Emergency.** If aircrews are unable, during an emergency, to continue on a VR or IR at the published altitude(s), they shall immediately squawk 7700 and contact the appropriate ATC facility.

### Note

Climbing above the MTR structure may place aircraft in close proximity to airways traffic; caution is advised.

### 5.1.7 Flight Over the High Seas

- a. International law recognizes the right of aircraft of all nations to fly in airspace over the high seas. By convention, procedures for international flight are prescribed and certain nations have agreed to provide air traffic services in designated airspace over the high seas. Naval aircraft are operated in accordance with ICAO procedures presented in OPNAVINST 3770.4 (Use of Airspace by Military Aircraft and Firing Over the High Seas) and DOD FLIP General Planning, which address use of airspace by U.S. military aircraft and define due regard operations for military aircraft.

b. During flight operations at sea, tower or radar control by a ship, Fleet Area Control and Surveillance Facility (FACSFAC), or other suitable agency, shall be used to the maximum extent practicable. The degree of control shall be appropriate to the nature of the operation, classification of airspace, number of aircraft involved, and the requirement to coordinate aircraft ingress and egress to/from the operating area.

c. When operating offshore within domestic ARTCC boundaries, airspace of the Hawaiian Islands, and the San Juan Domestic Control Area, Navy policy is to use domestic air traffic control services and procedures to the maximum extent practicable consistent with mission requirements.

#### Note

When radar control of fixed-wing aircraft is being provided by a Navy ship or shore station in airspace managed by a FACSFAC, continuous two-way communication is required between that ship or shore station and the FACSFAC. Also the FACSFAC must maintain two-way communication with the appropriate FAA facility as required.

### 5.1.8 Supersonic Flight Operations

**5.1.8.1 General.** COs assigned aircraft capable of supersonic flight shall ensure that aircrews are thoroughly familiar with the shock wave phenomenon peculiar to supersonic flight. Serious damage, annoyance, and mental stress have resulted from sonic booms. It is incumbent on every pilot flying aircraft capable of generating sonic booms to reduce such disturbances and damage to the absolute minimum dictated by operational/training requirements.

**5.1.8.2 Policy.** Supersonic flight operations shall be strictly controlled and supervised by operational commanders. Supersonic flight over land or within 30 miles offshore shall be conducted in specifically designated areas. Such areas must be chosen to ensure minimum possibility of disturbance. As a general policy, sonic booms shall not be intentionally generated below 30,000 feet of altitude unless over water and more than 30 miles from inhabited land

areas or islands. Deviations from the foregoing general policy may be authorized only under one of the following:

- a. Tactical missions that require supersonic speeds
- b. Phases of formal training syllabus flights requiring supersonic speeds
- c. Research, test, and operational suitability test flights requiring supersonic speeds
- d. When specifically authorized by CNO for flight demonstration purposes.

#### 5.1.8.3 Reports, Inquiries, and Investigations

a. The Department of the Navy must accept responsibility for restitution and payment of just claims for damage resulting from sonic booms determined to have been caused by naval aircraft. To assist in determining validity of claims, all supersonic flights conducted over the continental United States or within 50 miles offshore shall be logged as to time, date, location, speed, and altitude of occurrence and retained at the unit level for 24 months.

b. Section 0910f of the Manual of the Judge Advocate General (JAGINST 5800.7) provides information and instructions concerning investigations into sonic boom complaints and alleged damage claims.

### 5.1.9 Aerobatic Flight

**5.1.9.1 General.** CNO does not desire to discourage or curtail aerobatic training; however, it is of the utmost importance that aerobatic training be well regulated as to time, place, and conditions that enhance safety of flight.

**5.1.9.2 Aerobatic Flight Precautions.** Aerobatic flight maneuvers, as defined in the Glossary, shall not be performed:

- a. If prohibited by the NATOPS manual or other directives applicable to a particular model aircraft.

- b. Over any congested area of a city, town, or settlement;
- c. Over an open air assembly of persons;
- d. Within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport;
- e. Within 4 nautical miles of the centerline of any Federal airway;
- f. Below an altitude of 1,500 feet above the surface; or
- g. When flight visibility is less than 3 statute miles.

**5.1.9.3 Designated Aerobatics Areas.** Appropriate commanders shall establish and designate areas in which aerobatics may be performed in compliance with the above restrictions and, under FAR, Part 91.303, in airspace where FARs apply. Pilots are encouraged to conduct aerobatic flight within the limits of designated aerobatic areas whenever the assigned mission permits.

### **5.1.10 Simulated Air Combat Maneuvering (ACM) Training Rules**

#### **5.1.10.1 General**

- a. ACM is defined as the following:
  - (1) Aggressive three-dimensional maneuvering between two or more aircraft simulating offensive or defensive aerial combat where the potential for a role reversal exists.
  - (2) Defensive maneuvers or other combat avoidance maneuvers by one or more aircraft.

#### **Note**

- Aerobatic maneuvers in accordance with NATOPS manuals on scheduled training flights approved by competent authority are not considered to be ACM. However, single aircraft practicing ACM maneuvers shall comply with the appropriate portions

of the training rules (decks, cloud clearance, area, g warmup, etc.).

- Air intercepts, performed in accordance with NATOPS manuals or as prescribed by cognizant TYCOMs are not considered to be ACM. These intercepts shall result in no more than 180 degrees of turn by any aircraft postmerge and shall be terminated prior to any potential role reversal; however, applicable portions of the training rules (intercept/element deconfliction) shall be briefed.
- The following maneuvers are considered to be ACM. This list should not be considered to be all inclusive.
  - (a) Neutral starts (to include butterfly starts)
  - (b) Offensive/defensive perches
  - (c) Scissors maneuvers (roller, flat, looping)
  - (d) Gun defenses
  - (e) Missile defenses to full blown engagements.
- The following maneuvers are not considered to be ACM. However, ACM flight leads should use prudent headwork to ensure that adequate separation from clouds can be maintained during any three-dimensional maneuvering:
  - (a) Snapshot drill (guns weave, weapons weave)
  - (b) Tail chase (heat-to-guns drill)
  - (c) Forward quarter missile defenses that are terminated at the merge.

b. ACM qualification proficiency requirements and a training syllabus shall be issued by COMNAVAIRLANT, COMNAVAIRPAC, COMNAVAIRESFOR, or CMC. Pilots and naval flight

officers flying ejection seat aircraft shall complete out of control flight (OOCF)/spin training for currently assigned aircraft, as deemed appropriate by TYCOMs. Training flights shall be conducted under a formal training syllabus under direct supervision of mature, experienced flight leaders and only after all participants have been thoroughly briefed on the conduct of the flight. Unscheduled and/or unbriefed simulated combat between naval aircraft or between naval aircraft and aircraft of any other service or registry is prohibited.

c. Pilots of naval aircraft shall not make simulated attacks on any aircraft that has troops or passengers embarked except as may be authorized by fleet commanders for exercises where coordinated and scheduled simulated attacks against military troop transport aircraft are desired for training purposes.

d. Squadron commanders will ensure that all participants are qualified and current in accordance with applicable directives in order to participate in ACM.

e. Prior to commencing ACM maneuvering, fixed-wing aircrews shall perform a “g” awareness maneuver. This maneuver shall consist of a total of 180 degrees of turn and should be used to operationally check g-suits and to practice straining maneuvers up to an amount of g’s approaching the maximum amount anticipated on that particular flight.

f. If an aircrew experiences g loss of consciousness (GLOC) during any portion of the flight, the flight shall immediately terminate and that aircraft shall return to base.

g. Departure/spin recovery procedures shall be covered for all ACM participants during the pre-flight brief.

h. A face-to-face brief shall be conducted by colocated ACM participants with a minimum one individual from each participating unit. For units not colocated, a telephone brief shall be conducted to satisfy face-to-face briefing requirements. A pre-exercise brief, memorandum of agreement, email, or fax may be used to complement or finalize prior face-to-face or telephone coordination between participating units. Hard and/or soft documents such as these are encouraged to

add depth to training rules, special instructions, and conduct of flight coordination; however, they shall not replace the requirements mandated in a face-to-face or telephone brief. The following guidelines for telephone briefs and debriefs apply:

(1) A flight representative shall conduct the coordination/special instructions brief.

(2) All applicable training rules shall be covered during the telephone brief and included in the pre-exercise brief, memorandum of agreement, email, or fax.

(3) The flight representative receiving the brief for composite or joint force training will brief all other participating aircrews prior to their flights.

#### 5.1.10.2 ACM Training

a. The nature of ACM demands that pilots be thoroughly familiar with the performance capabilities and limitations of the aircraft being flown. Rapid changes in heading, altitude, and the wide range of velocities generated greatly increase the possibility of collisions between aircraft. ACM must be closely supervised and training rules (TR) (formerly rules of engagement) applied that will provide a high degree of safety for all concerned.

b. Such training shall be conducted in airspace as nearly free from other aircraft as practicable. It shall be conducted only in designated warning/restricted areas, in controlled airspace as assigned by ATC, or in other designated areas where safe separation from non-participants can be maintained. As a minimum, designated ACM areas shall be clear of Federal airways, Class B, C, or D airspace, and other areas of traffic congestion unless established under a letter of agreement with the FAA or host nation. TYCOMs or officers in tactical command (OTCs), when deployed, shall designate ACM training areas and establish procedures to ensure that entering flights are aware of the existence of other scheduled flights operating there.

c. The ACM training rules set forth here are minimum requirements. Supplementary directives shall be issued as required by responsible commanders delineating syllabus contents, proficiency levels required, communication procedures, safety precautions, and other applicable areas of concern.



**5.1.10.3 ACM Training Rules.** The following rules are intended to provide guidance for conducting safe, accident-free ACM training:

a. Always assume the other aircraft does not see you.

b. Aircraft **shall** maneuver to maintain at least 500 feet of separation from all other aircraft during engagements, including aircraft within the same division/section.

c. During a forward quarter or head-on pass (track crossing angle greater than 135 degrees), both aircraft shall maintain the established trend. Where no established trend exists, each aircraft shall give way to the right to create a left-to-left pass. When operating on the same radio frequency, aircrew should broadcast their own intentions if the direction of pass is in doubt. When operating on dual frequencies, exaggerate aircraft movements to ensure that the other aircraft recognizes your intentions.

d. The “up-sun” aircraft has responsibility for maintaining flight separation. If the up-sun aircraft loses sight, it shall broadcast lost sight and maintain a predictable flight path. If the “down-sun” aircraft loses sight, it shall break off the attack, lag the up-sun aircraft, and broadcast that it has lost sight. If the up-sun aircraft still has sight of the down-sun aircraft and safe separation can be maintained, the up-sun aircraft shall immediately broadcast “continue”, otherwise a knock-it-off shall be initiated.

e. An aircraft pursuing another aircraft in a descent shall monitor the defensive aircraft’s altitude/attitude and break off the attack with a turn away prior to either aircraft descending through the applicable altitude deck based on airspeed and angle of attack.

f. Nose-high aircraft on converging flightpaths shall deconflict with the higher nose attitude aircraft going high unless unable because of energy state or aircraft performance. The low or nose-low aircraft has the responsibility for maintaining flight separation.

g. A lead turn conducted while on converging flightpaths that causes the attacking aircraft to lose sight is prohibited.

h. With an offensive aircraft approaching gun parameters, defensive aircraft shall not dispense flares as part of a gun defense or as a distraction.

i. Fixed wing versus fixed-wing training rules:

(1) Missile attacks. All fixed-wing, forward-quarter missile attacks (attempts to obtain AIM-9 tone rise or self-track from boresight, or attempts to obtain a radar lock from boresight) within 20 of the targets nose shall be broken off at a minimum of 9,000 feet. Inside 9,000 feet, the pilots undivided attention shall first be devoted to maintaining flight separation. Inside 9,000 feet, off-boresight missile attacks may be prosecuted down to missile minimum range provided that flight separation has already been established.

(2) Gun attacks. Fixed-wing gun attacks shall be broken off at a minimum of 1,000 feet so as not to pass any closer than 500 feet to the defensive aircraft. Gun attacks in excess of 135 degrees track crossing angle (approaching head-on) are prohibited.

(3) Intercept deconfliction.

(a) Aircrews conducting ACM or intercepts shall establish assigned blocks by 10 NM of the merge without situational awareness (SA) of the aircraft/formation being intercepted.

(b) Altitude blocks shall normally be MSL-definable in 4,000 foot intervals (For example, Blue Air 5-9’s, Red Air 0-4’s) for all aircraft not equipped with radar altimeters. In mountainous terrain for Blue Air aircraft with training objectives that require operation in a low altitude arena, a three thousand foot AGL definable block (i.e., Blue Air 1,000-4,000 feet AGL) for radar altimeter equipped aircraft is permissible. For situations where weather is less than ten thousand feet of clear air, Red Air will own the top two thousand feet of the defined clear airspace, and Blue Air will own all clear airspace below the Red Air block (For example Blue Air 0-5, Red Air 6-8). In all

cases where significant terrain, low level ingress routes, or non-maneuvering intercepts (e.g., 1V1 all-weather intercepts) are involved, any adjustments to Red and Blue Air altitude block deconfliction shall be thoroughly briefed.

(4) Element deconfliction. Blind aircraft within an element shall immediately transmit blind, and wingman shall respond visual with his position. If the wingman is simultaneously blind, he shall transmit "blind" with his altitude and maintain a level flight plan. It is the responsibility of the first aircraft in the element that calls "blind" to establish altitude deconfliction. If communications are prohibited, each aircraft that remains blind shall maintain a level and predictable flight path, and his priority shall be to clear his flight path.

(5) Engagement deconfliction.

(a) The maximum number of aircraft allowed in an ACM engagement is 8.

(b) Blue and Red Air roles shall be clearly defined for each prior to fights on.

(c) Blue Air shall not turn at an engagement unless they have sufficient SA to clear their flight path. This SA may be obtained from onboard sensors, communication with element members/AIC, or tally (sight of adversary)/visual (sight of wingmen). Without a tally visual on all fighters and bandits, aircraft shall conduct belly checks at a minimum every 90 degrees of turn.

(d) Red Air shall have a more restrictive mindset to provide predictability than required of Blue Air. If not tally all fighters, Red air shall maintain a predictable flight path in their block until positive SA assures that they are clear of the merge/engagement. This SA may be obtained from onboard sensors, communication with element members/AIC, and/or tally/visual.

j. Fixed wing versus helicopter training rules:

(1) All aircrew shall have completed initial low-altitude flight training as outlined by ap-

propriate COMNAVAIRPAC, COMNAVAIRLANT, COMNAVAIRESFOR, or CMC directives.

(2) Supersonic flight is not authorized.

(3) If aircraft lose sight, they shall disengage. Fixed-wing aircraft shall climb to at least 3,000 feet AGL. Helicopters shall climb to at least 300 feet AGL.

(4) Fixed-wing gun attacks shall be broken off at a minimum of 1,000 feet.

k. Helicopter versus helicopter training rules:

(1) All aircrew shall have completed initial low-altitude flight training as outlined by appropriate COMNAVAIRPAC, COMNAVAIRLANT, COMNAVAIRESFOR, or CMC directives.

(2) During prebriefed tail chase maneuvers, aircraft shall maintain a minimum of 200 feet of separation.

(3) An engagement shall be terminated if all aircrews unintentionally lose sight of each other. The engagement shall not be resumed until all participants have reacquired each other.

(4) Close range helicopter engagements shall involve no more than two 360 degree turns.

(5) Pilots shall not attempt to counter an adversary's altitude advantage with erratic or excessive climbing maneuvers.

(6) Astern gun attacks shall be broken off at a minimum of 500 feet.

**5.1.10.4 ACM Communication Requirements.** To facilitate positive control of aircraft and provide adequate safety measures, the following shall apply for the conduct of flights involving ACM training:

a. All aircraft participating in ACM shall have two-way radio communication. All multiplace aircraft shall have an operable intercommunication system (ICS).

b. Guard frequency shall be monitored throughout all engagements.

c. A single aircraft engaging another single aircraft shall monitor a common radio frequency.

d. Multiple flights:

(1) Flights of two or more aircraft engaging another flight of one or more aircraft may operate on assigned separate frequencies using either of the following control measures: each flight is under positive radar control of separate controllers and a senior air director (SAD) in the supervisory role is monitoring both frequencies, or each flight is under the positive control of separate range training officers (RTOs) or a tactical aircrew combat training system (TACTS) instrumented range. When a potentially dangerous situation develops, a call to "Knock it off"/terminate shall be relayed by the SAD or RTO on both frequencies. TYCOMs may waive this restriction as requirements dictate.

(2) Dual-radio-equipped aircraft may elect to use a discrete intraflight frequency without separate GCI/TACTS control provided one radio is used to monitor the opposing section frequency.

e. Any no-radio (NORDO) aircraft shall rock its wings and assume 1g flight to signal loss of communication. If an aircraft rocks its wings or assumes a wings-level 1g condition during an encounter, that engagement shall be terminated.

f. If any aircrewman observes an unsafe or potentially dangerous situation developing, he/she shall announce it by transmitting, Knock it off/terminate, and shall maneuver appropriately to terminate the engagement.

**5.1.10.5 ACM Weather Criteria.** All ACM engagements shall be conducted in daylight VMC using the following criteria:

a. ACM shall not be conducted into or through an overcast or undercast.

b. The top of the undercast or broken cloud layer is the simulated ground level.

c. Fixed wing versus fixed wing shall be conducted with:

(1) At least 2,000 feet vertical and 1-nm horizontal separation from clouds at all times.

(2) Five miles minimum visibility with a defined horizon.

d. Fixed wing versus helicopter ACM shall be conducted with :

(1) A minimum ceiling of 3,000 feet above ground level (AGL).

(2) Five miles minimum visibility with a defined horizon.

e. Helicopter versus helicopter ACM shall be conducted with:

(1) A minimum ceiling of 1,000 feet AGL.

(2) Three miles minimum visibility with defined horizon.

**5.1.10.6 Fixed Wing Versus Fixed-Wing ACM Altitude Restrictions.** To ensure standardization and provide an adequate margin of safety, the following restrictions shall apply:

a. No sustained maneuvering shall occur below a 5,000-foot hard deck above the terrain or undercast (e.g., over 4,000-foot terrain or a 4,000-foot undercast, the hard deck shall be adjusted to 9,000 feet). If the terrain or undercast is not of uniform height in the area of engagement, the deck shall be adjusted to reflect the highest terrain/undercast. Aircrew shall also brief that visual altitude and attitude cues are not accurate under these circumstances.

b. High angle of attack (AOA)/slow-speed maneuvering shall be terminated passing through 10,000 feet AGL (soft deck). If the 5,000-foot AGL hard deck has been raised because of an undercast, high AOA/slow speed shall be raised and maneuvering shall be terminated at the appropriate altitude AGL (i.e., with a 4,000-foot AGL undercast, the hard deck shall be 9,000 feet AGL and the soft deck shall be 14,000 feet AGL). An aggressive, nose

**WARNING**

low, out of plane gun defense maneuver to defeat an attackers gun solution shall not be executed below the soft deck.

c. Offensive and defensive maneuvering below the 5,000-foot deck shall be conducted in accordance with the following:

(1) For aircrews not low-altitude-flight-training qualified and current in accordance with appropriate service directives, the minimum altitude shall be 500 feet AGL.

(2) For aircrews low-altitude-flight-training qualified and current in accordance with appropriate service directives, the minimum altitude shall be 200 feet AGL.

(3) Functional wing/operational/group commanders may request waivers from such minimum altitudes from COMNAVAIRLANT, COMNAVAIRPAC, COMNAVIARESFOR, or CMC as appropriate.

(4) When an offensive/defensive relationship is established, the defensive aircraft shall react with a wing rock, an extension or separation maneuver, or the continuation of a level or climbing defensive turn of not more than 180 degrees as measured from the heading at the beginning of the turn. The engagement shall also be terminated if a role reversal occurs.

(5) When during the initial maneuvering neither aircraft can be assessed as defensive, the engagement shall be terminated when any aircraft has turned a maximum of 180 degrees as measured from the heading at the beginning of the maneuvering.

(6) If the attacking aircraft's initial conversion turn is undetected, the engagement need not be terminated until the defensive aircraft reacts and turns a maximum of 180 degrees.

(7) If a low-flying, fixed-wing aircraft wishes to maneuver in excess of 180 degrees of turn, the initial turn shall be made so as to carry the pilot above the 5,000-foot deck. Once above 5,000 feet, ACM may be continued only if each aircraft meets the appropriate airspeed and AOA requirement for ACM below the soft deck. Any aircraft not meeting those requirements shall terminate ACM.

The flightpath behind a low-flying aircraft, co-altitude, should be avoided because of the effects of wake turbulence, jet or propeller wash, and the possibility of ordnance release. In addition, extended maneuvering precipitated by defensive reactions to repeated attacks can result in a depleted energy state such that continued maneuvers are unsafe because of ground proximity.

#### **5.1.10.7 Fixed Wing Versus Helicopter and Helicopter Versus Helicopter ACM Altitude Restrictions**

a. No fixed-wing (F/W) high AOA/slow-speed maneuvering below 10,000 feet AGL is authorized.

b. The following are the minimum altitudes for aircraft by type engagement:

(1) Helicopter versus helicopter – 100 feet AGL both aircraft.

(2) Helicopter versus F/W (low attack angle 0 to 10 degrees) – 100 feet AGL, 500 feet AGL respectively.

(3) Helicopter versus F/W (high attack angle greater than 10 degrees) – 100 feet AGL, 1,000 feet AGL respectively.

**5.1.10.8 Fixed Wing Versus Fixed-Wing ACM and Ground Attack Interface.** The following additional ACM related rules apply to multimission and composite force training where ground attack and escort aircraft may come under attack:

a. Aggressor aircrew shall be briefed on target location for any ordnance drops. The briefing shall include planned weapon delivery maneuvers and type ordnance, as appropriate. Aggressors shall break off an attack on strike aircraft below 10,000 feet AGL at a minimum of 3 nm prior to the designated target area. In no case shall strike aircraft be attacked while executing an ordnance delivery maneuver.

b. Aircraft carrying live external A/G ordnance shall not engage in ACM. A wing rock or a defensive hard turn, not to exceed 180 degrees, may be made to acknowledge an attack. Aircraft carrying inert ordnance (including captive carry air-to-ground missiles) may engage in ACM at the discretion of the squadron CO based on weight/drag and specific aircraft performance.

c. Aggressor aircraft shall discontinue attack on a strike/escort aircraft following the strike/escort aircraft's wing rock or defensive turn (maximum of 180 degrees).

d. "Knock it off" means that all participating elements in an exercise shall cease maneuvering. Terminate applies to individual elements or engagements within an overall exercise and means the individual units involved in a localized engagement shall cease maneuvering for that particular engagement without knocking off the entire exercise. After terminating a localized engagement, the affected aircraft are free to pursue additional missions within the exercise in accordance with pre-briefed instructions. Knock it off calls shall be acknowledged via UHF radio calls by all participating pilots using individual call signs.

#### 5.1.10.9 Termination of ACM Engagements

a. ACM shall cease when:

- (1) Any training rule is violated.
- (2) "Knock it off/terminate" is called by any aircrew or controller.
- (3) Any dangerous situation develops or there is a loss of situational awareness.
- (4) Any out-of-control flight situation develops.
- (5) Radio failure by any aircraft.
- (6) Bingo fuel state is reached.
- (7) Training objectives have been accomplished.
- (8) An unbriefed aircraft enters the engagement area and is detrimental to flight safety.
- (9) When an aircraft rocks its wings (fixed or rotary).

b. At the completion of engagement, aircraft shall maneuver appropriately to deconflict with all other aircraft and should extend beyond visual range prior to any reattack, consistent with the briefed training objectives. The intent is to prevent visual repositioning and repeated attacks against defending aircraft that are pursuing a different mission.

c. All ACM participants have responsibility for termination of ACM training engagements when a dangerous or rapidly deteriorating situation is recognized.

#### WARNING

High midair collision potential exists following "Knock it off" calls.

#### 5.1.11 Simulated Instrument Flight

**5.1.11.1 Chase Aircraft Requirement.** A chase aircraft shall be used for all simulated instrument flight in single-piloted aircraft when a vision restricting device is being used. A chase plane shall also be required for simulated instrument flight in multipiloted aircraft if adequate cockpit visual lookout cannot be maintained. Visual lookout is considered adequate:

a. For side-by-side seating configurations, when two crewmen in addition to and having positive communication with the pilot are aboard. One crewman must be in a suitable position to monitor the flight instruments and both crewmen together must be able to clear the aircraft from potential midair collision hazards.

b. For tandem seating configurations, when the vision-restricting device is being used only in the rear seat.

**5.1.11.2 Chase Aircraft Position and Communication.** The chase plane should fly in a position 500 feet aft and 500 feet to either side of the aircraft being chased so as to ensure clearance in all quadrants. Positive communication must be main-

tained at all times between the two aircraft and any controlling agency. If communication is lost, the pilot practicing simulated instruments shall immediately go contact and remain contact until positive communication is reestablished.

**5.1.11.3 Altitude Limitations.** Pilots of single-seat aircraft may not use a vision restricting device below 1,000 feet AGL except on a precision approach. The vision restricting device may be used down to 500 feet AGL. In single-piloted aircraft, with dual sets of flight controls and in multipiloted aircraft, a vision restricting device may be used by one pilot for simulated instrument takeoffs and down to minimums for the approach being flown, provided the other pilot is NATOPS qualified in model. Helicopters equipped with automatic hover equipment are specifically waived from simulated instrument altitude restrictions during low level ASW/ SAR training, provided the pilot not on the controls is NATOPS qualified in model.

## **5.1.12 Formation Flying**

**5.1.12.1 General.** Formation flying is authorized only for units and types of aircraft for which a valid requirement exists. Appropriate commanders shall ensure issuance of and adherence to specific instructions and standard operating procedures for all aspects of formation flying.

**5.1.12.2 Preflight.** The formation leader shall execute one flight plan for the entire formation and shall:

- a. Sign the flight plan form as pilot in command.
- b. Ensure that all pilots are briefed on en route weather and navigational aids.
- c. Ensure that each pilot holds a valid instrument rating if any portion of flight is to be conducted under IMC.
- d. Ensure that a flight leader formation brief is conducted to include, but not to be limited to, loss of sight, lost communication, inadvertent IMC, and emergency procedures.
- e. Ensure that necessary maps, charts, and publications are in the possession of each pilot.
- f. Ensure that formation integrity is maintained in flight.

**5.1.12.3 Formation Takeoffs.** Section takeoffs for fixed-wing aircraft of similar performance are authorized only for units and types of aircraft whose military missions require formation flying, including essential pilot training. On ground roll, safe lateral separation shall be maintained (in event of blown tire, aborted takeoff, etc.) with leading aircraft on downwind side (if crosswind exists). Differences in flying characteristics, especially stall speeds because of gross weight and/or configuration, shall be considered.

### **Note**

Lateral separation for required minimum interval takeoff (MITO) shall be governed by local directives.

**5.1.12.4 Instrument Departures.** Two-plane formation for subsequent flight into instrument conditions is authorized provided the weather (ceiling and visibility) is at or above the published circling minimums for the runway in use. In the event a circling approach is not authorized, ceiling and visibility must be at least 1,000 feet and 3 statute miles.

**5.1.12.4.1 Radar Trail Departures.** For aircraft equipped with operable air-to-air radar capability, formations of up to four aircraft are authorized to depart as a nonstandard formation (radar trail departure) when existing weather conditions are other than prescribed in paragraph 5.1.12.4 and that nonstandard formation has been approved by the ATC Facility responsible for providing instrument separation (i.e., departure control, ARTCC).

## **5.1.12.5 Joining Formations**

- a. Unless specifically ordered, a single aircraft shall not join a formation in the air. One formation shall not join another formation. The order for joining formation in the air shall be given prior to takeoff of the aircraft concerned or by radio, and the leader of the formation to be joined shall be informed that the order has been given. Exceptions to this paragraph may be made when the leader of a formation signals another aircraft to join the formation.
- b. When about to join a formation, the pilot of a single aircraft or leader of other formations shall

approach their formation position from a safe altitude and from the side. They shall not take their final position until their presence has been acknowledged by the leader of the formation to be joined.

c. Whenever a lead change is required in a formation of two or more aircraft, it will be accomplished in an unambiguous manner. Pilots shall ensure that both aircraft exchanging the lead are aware of the change through positive acknowledgment by visual signals or voice transmissions.

#### **5.1.12.6 Approach Criteria for Aircraft in Formation**

a. Instrument approaches with or without intent to land in IMC by formations of more than two aircraft are not authorized. Penetration of IMC to obtain VMC by formations of more than two aircraft is authorized.

b. Formation flights shall not commence an instrument approach when the reported weather is less than circling minimums for the runway in use. In the event a circling approach is not authorized, the ceiling and visibility must be at least 1,000 feet and 3 statute miles. Once an approach has been commenced, leaders may, at their discretion, continue the approach in formation to the minimums prescribed in paragraph 5.3.4 for the type aircraft being flown.

c. Whenever feasible, aircraft making section instrument penetrations/approaches should transition to landing configuration above the overcast whenever existing weather is below VFR minimums. Aircraft in formation shall not obtain interval by slowing to less than normal approach speed by "S" turning. If safe landing interval cannot otherwise be obtained, a waveoff shall be executed. When landing interval will result in two or more aircraft on the runway at the same time, staggered landings on alternate sides of the runway shall be made. When crosswind conditions dictate or when centerline landings are preferred, landing interval shall be the same as that required for aircraft proceeding independently.

d. Formation approaches by aircraft of markedly different approach performance characteristics are not recommended.

e. Formation touch-and-go landings are prohibited.

**5.1.12.7 Dissimilar Formation Flight.** Pilots involved should perform a preflight brief delineating all aspects of the pending formation flight. Items to be briefed in addition to those identified above shall include items peculiar to either aircraft community (e.g., limitations/capabilities/hazards affecting the flight/ rendezvous/joinup/separation).

**5.1.12.8 Unplanned Formation Flight.** In the event unscheduled formation flight becomes necessary, every attempt shall be made by the aircrew involved to conduct a sufficient in-flight brief prior to joinup.

### **5.2 VISUAL FLIGHT RULES PROCEDURES**

**5.2.1 Compliance With Directives.** The pilot in command shall ascertain that the contemplated flight can be conducted in accordance with the visual flight requirements of FAR, other governing regulations, and flight rules set forth in this instruction. Visual meteorological conditions are the flight weather conditions that permit military aircraft operations under VFR. If weather conditions are not VMC, military aircraft operations must be either under special VFR or IFR (excluding special military operations).

**5.2.2 Judgment.** Although the choice of flight rules to be followed is normally dictated by weather and mission considerations, sound judgment plays a most important role. There are occasions when VFR may be legally followed by applying the appropriate visibility and cloud clearance criteria. That prerogative should be exercised with reasonable restraint. The established weather criteria are minimums. The pilot should allow a greater margin of safety when operational requirements permit, particularly in terminal areas or when reduced visibility or cloud conditions make flight under VFR questionable. Pilots shall file and retain an IFR clearance to the maximum extent practicable consistent with mission accomplishment. (See paragraphs 5.3.1 and 6.4.)

**5.2.3 See and Avoid.** The see-and-avoid concept applies to visual flight conditions, thus eliminating the need for specific route clearance from ATC agencies under most circumstances. Since pilots are

responsible for their own separation from other aircraft, conditions must exist that permit ample opportunity to see and avoid other air traffic and maintain obstruction clearance. The following measures shall serve as additional precautions when separation is maintained through the see-and-avoid concept, provided no degradation of the assigned mission will result.

- a. Excepting single-seat aircraft, electronic equipment such as airborne radar should be used where feasible.
- b. Where available, radar advisory service shall be requested especially when VFR flight is required through high-density traffic areas.

**5.2.4 Weather Minimums.** Within airspace where FAR, Part 91, pertains, cloud clearance and visibility minimums shown in Figure 5-1 shall prevail throughout a VFR flight. In addition, ceiling and visibility minimums within Class B, C, D, or E surface areas must be at least 1,000 feet and 3 statute miles. If more stringent VFR minimums have been established for the point of departure or destination, as noted in the supplementary airport remarks section of the DOD FLIP AP/1, AP/2, AP/3, or AP/4 then ceiling and visibility must be at or above those minimums in the applicable Class B, C, D, or E surface area. Existing and forecast weather must be such as to permit VFR operations for the entire duration of the flight. Destination weather shall be at least 1,000-foot ceiling and 3-statute mile visibility (or such higher minimums as noted in the supplementary airport remarks section of the DOD FLIP AP/1, AP/2, AP/3, or AP/4) and forecast to remain at or above those minimums during the period 1 hour before ETA until 1 hour after ETA. Exceptions to the minimums are as follows:

- a. Deviations under FAR 91.157, Special VFR Weather Minimums, are permitted except at those airports where special VFR is not authorized in fixed-wing aircraft. For special VFR within controlled airspace, the pilot must obtain authorization from air traffic control; ceiling must be a minimum of 500 feet; visibility must be a minimum of 1 statute mile; aircraft must remain clear of clouds, and (except for CNATRA helicopter operations) the pilot and aircraft must be certified for instrument flight. Aviation commanding officers in the chain of command may authorize tilt-rotors in helicopter

conversion mode and helicopter special VFR flights in conditions below 500 feet/1 mile for missions of operational necessity. The authority granted by this paragraph shall not be delegated.

- b. Outside of controlled airspace, tilt-rotors in helicopter conversion mode and helicopters may be operated below 1,200 feet AGL, clear of clouds, when the visibility is less than 1 statute mile if operated at a speed that allows the pilot adequate opportunity to see and avoid other air traffic and maintain obstacle clearance.

#### Note

FLIP General Planning, Chapter 6 (International Rules and Procedures), outlines the general flight rules for operation of military aircraft in airspace where FAR 91 does not apply.

**5.2.5 Weather Conditions Precluding VFR Flight.** When weather conditions encountered en route preclude compliance with visual flight rules, the pilot in command shall take appropriate action as follows to:

- a. Alter route of flight so as to continue under VFR conditions or
- b. Remain in VFR conditions until a change of flight plan is filed and IFR clearance obtained or
- c. Remain in VFR conditions and land at a suitable alternate.

#### 5.2.6 Additional Requirements

- a. Except when necessary for takeoff and landing or when the mission of the flight requires otherwise, flights in fixed-wing aircraft shall not be conducted below an altitude of 500 feet above the terrain or surface of the water.
- b. For aircraft to operate on a VFR clearance above broken clouds or an overcast, climb to and descent from such on top flight shall be made in accordance with VFR and aircraft shall be equipped and pilots qualified for instrument flight.
- c. A simulated instrument approach to an airport for which an approved instrument approach exists



AIRSPACE	FLIGHT VISIBILITY	DISTANCE FROM CLOUDS
CLASS A	NOT APPLICABLE	NOT APPLICABLE
CLASS B	3 STATUTE MILES	CLEAR OF CLOUDS
CLASS C	3 STATUTE MILES	500 FEET BELOW 1,000 FEET ABOVE 2,000 FEET HORIZONTAL
CLASS D	3 STATUTE MILES	500 FEET BELOW 1,000 FEET ABOVE 2,000 FEET HORIZONTAL
<u>CLASS E</u> LESS THAN 10,000 FEET MSL  AT OR ABOVE 10,000 MSL	3 STATUTE MILES  5 STATUTE MILES	500 FEET BELOW 1,000 FEET ABOVE 2,000 FEET HORIZONTAL  1,000 FEET BELOW 1,000 FEET ABOVE 1 STATUTE MILE HORIZONTAL
<u>CLASS G</u> 1,200 FEET OR LESS ABOVE THE SURFACE (REGARDLESS OF MSL ALTITUDE)  DAY, EXCEPT AS PROVIDED IN §91.155(b)  NIGHT, EXCEPT AS PROVIDED IN §91.155(b)	1 STATUTE MILES  3 STATUTE MILES	CLEAR OF CLOUDS  500 FEET BELOW 1,000 FEET ABOVE 2,000 FEET HORIZONTAL
MORE THAN 1,200 FEET ABOVE THE SURFACE BUT LESS THAN 10,000 FEET MSL  DAY	1 STATUTE MILES	500 FEET BELOW 1,000 FEET ABOVE 2,000 FEET HORIZONTAL
NIGHT	3 STATUTE MILES	500 FEET BELOW 1,000 FEET ABOVE 2,000 FEET HORIZONTAL
MORE THAN 1,200 FEET ABOVE THE SURFACE AND AT OR ABOVE 10,000 FEET MSL	5 STATUTE MILES	1,000 FEET BELOW 1,000 FEET ABOVE 1 STATUTE MILE HORIZONTAL

Figure 5-1. Basic VFR Flight Minimums

shall not be commenced until prior approval has been obtained from the appropriate approach control or, in the case of nonapproach control locations, the airport traffic control tower. At non-tower airports, the associated flight service station, if applicable, shall be notified of the simulated instrument approach.

### 5.3 INSTRUMENT FLIGHT RULES AND POSITIVE CONTROL PROCEDURES

#### 5.3.1 General Requirements

**5.3.1.1 IFR Filing and Positive Control.** To decrease the probability of midair collisions, all flights in naval aircraft shall be conducted in accordance with IFR to the maximum extent practicable. This shall include all point-to-point and round-robin flights using Federal airways and other flights or portions thereof, such as flights to and from target or operating areas accessible through IFR filing. All other flights shall be conducted under positive control to the maximum extent possible. This shall apply in the following areas:

- a. In the airspace over the United States and adjacent coastal waters within the 12-mile limit.
- b. Within offshore operating areas of CONUS and Alaska outward to the limit of the domestic Air Route Traffic Control Center (ARTCC), airspace in the Hawaiian Islands, and in the San Juan Domestic Control Area.
- c. Airspace in the vicinity of other U.S. territories and overseas airfields as prescribed by local area commander policies.

#### Note

- Commanding officers shall ensure compliance with the intent and spirit of this requirement and shall scrutinize all flight operations as to mission and purpose to assure they are conducted in accordance with IFR or positive control to the maximum extent practicable without mission degradation.
- Global positioning system (GPS) shall not be used as the means of navigation to file or fly in the National Airspace Sys-

tem unless that aircraft has been certified for GPS use in the National Airspace System.

- Aircrew operating in visual conditions under IFR should be aware that they are in a see and avoid environment. ATC provides separation only from other IFR aircraft.

**5.3.1.2 Waiving IFR Requirement.** Where VFR conditions exist, pilots may waive this requirement for specific flights when necessary to circumnavigate or otherwise avoid severe weather or when dictated by an in-flight emergency.

**5.3.1.3 ATC Clearance Requirement.** Flights shall not be made in IFR conditions within controlled airspace until an ATC clearance has been obtained.

**5.3.1.4 Instrument or Composite Flight Plan.** An instrument or composite (VFR/IFR) flight plan shall be filed for all flights that may reasonably expect to encounter in-flight IFR conditions during any portion of the planned route. The VFR portion of the flight shall meet VFR criteria set forth in paragraph 5.2.

**5.3.1.5 Compliance With Directives.** The pilot in command shall ascertain that the clearance requested is in accordance with the instrument flight requirements of FAR, other governing regulations, and flight rules set forth in this instruction.

#### 5.3.1.6 Minimum Altitude

- a. When out of controlled airspace and only when the mission of the flight requires otherwise, an aircraft shall not be flown less than 1,000 feet above the highest terrain, surface of the water, or obstacle within 22 miles of the intended line of flight.
- b. When out of controlled airspace and over designated mountainous terrain, as shown in appropriate DOD FLIPs, an aircraft shall not be flown less than 2,000 feet above the highest terrain or obstacle within 22 miles of the intended line of flight.
- c. In controlled airspace, an aircraft shall not be flown at less than the minimum en route altitude or the altitude specified by the agency exercising control over the airspace concerned when operating in IFR conditions.

d. Authorized missions may be flown at lower altitudes than specified above when operating on published IFR military training routes (IRs) that have been developed in accordance with OPNAVINST 3722.33 (FAA Order 7610.4, Special Military Operations).

**5.3.2 Aircraft Equipment Requirements.** Pre-flight procedures will be established and monitored to assure that communication, navigation, and identification equipments required for the flight are operative at takeoff. Preflight/in-flight malfunctions of such equipment shall be construed as adequate cause to cancel/ abort missions other than those of operational necessity. The pilot shall ensure that ATC is advised of any limitations of the pilot's aircraft and equipment that will necessitate special handling.

#### 5.3.2.1 Instrument Flight Equipment

a. The pitot heater and all vacuum pressure or electrical sources for the pilot flight instruments must operate satisfactorily.

b. The aircraft shall be equipped with the following instruments in proper operating condition:

- (1) Airspeed indicator
- (2) Altimeter
- (3) Turn-and-slip indicator
- (4) A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital readout
- (5) Attitude indicator
- (6) Magnetic compass with current calibration card
- (7) Heading indicator or gyrostabilized magnetic compass
- (8) Vertical speed indicator.

c. Aircraft shall be equipped with deicing or icing control equipment for sustained or continuous flight in known or forecast icing conditions.

d. Navigation lights must operate satisfactorily.

#### 5.3.2.2 Communication, Navigation, Identification (CNI) Equipment

a. The aircraft shall have two-way radio communication equipment and operating navigation equipment required for the en route and approach navigation aids to be used and on which the clearance is predicated.

b. Pilots planning to operate in or through areas that require special communication frequencies shall ensure that the frequencies are available in the aircraft.

c. A functioning radar beacon transponder is required for flight in airspace where FAR specify such equipment.

d. When operating with a servoed altimeter below FL 180, use either the STANDBY or RESET mode and use only the RESET mode when operating above FL 180.

e. Any GPS receiver may be used as an aid to visual navigation only.

#### Note

- Current military GPS avionics have neither an integrity monitoring capability nor a navigation waypoint database. Therefore, current military GPS is not authorized for supplemental, primary, or sole means of air navigation for instrument flight in controlled airspace. Commercial FAA approved GPS naval aircraft integration is authorized for use up to the level of navigation approved by the FAA. Specific procedures are contained in appropriate NATOPS manuals.
- Navigation with handheld receivers during instrument conditions is prohibited.

**5.3.2.3 Instrument Navigation Packet.** The following items constitute the minimum required articles to be included in instrument navigation packets. Additional items may be included when required by local operating procedures.

- a. Appropriate FLIPs
- b. Navigation computer

- c. Navigation flight log forms
- d. Appropriate aeronautical charts.

### 5.3.3 Instrument Departures

#### 5.3.3.1 Takeoff Minimums

- a. Special instrument rating - No takeoff ceiling or visibility minimums apply. Takeoff shall depend on the judgment of the pilot and urgency of flights.
- b. Standard instrument rating - Published minimums for the available non-precision approach, but not less than 300-foot ceiling and 1-statute mile visibility. When a precision approach compatible with installed and operable aircraft equipment is available, with published minimums less than 300/1, takeoff is authorized provided the weather is at least equal to the precision approach minimums for the landing runway in use, but in no case when the weather is less than 200-foot ceiling and 1/2-statute-mile visibility/ 2,400-foot runway visual range (RVR).

**5.3.3.2 Departure Procedure (DP).** At locations where **DPs** are available, pilots are encouraged to utilize them for each IFR departure, provided no unacceptable flight degradation will ensue. An appropriate **DP** procedure should be selected during preflight planning for pilots to realize the greatest benefit from standardization of instrument departures and to have a clear course of action to follow in the event of communication failure.

#### Note

For formation instrument departures and approach procedures, see paragraph 5.1.12.

### 5.3.4 Instrument Approaches and Landing Minimums

**5.3.4.1 General.** Approved instrument approach procedures for use at other than U.S. airports are published in DOD FLIPs (Terminal). For U.S. airports, approved instrument approach procedures are published in DOD FLIPs (Terminal) or other similar type publications. For straight-in approaches, pilots shall use RVR, if available, to determine if visibility

meets the weather criteria for approaches, which are published in DOD FLIP Terminal Approach Procedures. Prevailing visibility shall be used for circling approach criteria. Helicopters and tilt-rotor-required visibility minimum may be reduced to one-half the published visibility minimum for Category A aircraft, but in no case may it be reduced to less than one-fourth mile or 1,200 feet RVR. Helicopter procedures visibility may not be reduced. Helicopter procedures and reduced Category A visibility recognize the unique maneuvering capability of the helicopter and tilt-rotor are based on airspeeds not exceeding 90 knots on final approach.

#### Note

Determination that existing weather/visibility is adequate for approach/landing is the responsibility of the pilot.

**5.3.4.2 Approach Criteria for Multipiloted Aircraft.** When reported weather is at or below published landing minimums for the approach to be conducted, an approach shall not be commenced in multipiloted aircraft unless the aircraft has the capability to proceed to a suitable alternate in the event of a missed approach.

#### 5.3.4.3 Approach Criteria for Single-Piloted Aircraft

a. An instrument approach shall not be commenced if the reported weather is below published minimums for the type approach being conducted. When a turbojet en route descent is to be executed, the approach is considered to commence when the aircraft descends below the highest initial penetration altitude established in high altitude instrument approach procedures for the destination airport. Once an approach has been commenced, pilots may, at their discretion, continue the approach to the approved published landing minimums as shown in the appropriate FLIP for the type approach being conducted. Absolute minimums for a single-piloted aircraft executing a precision approach are 200-foot ceiling/height above touchdown (HAT) and visibility 1/2-statute-mile/ 2,400 feet RVR or published minimums, whichever is higher.

b. Single-piloted aircraft that are configured for and assigned all-weather missions with side-by-

side seating occupied by the pilot in command and an assisting NFO may operate within the same filing, clearance, and approach criteria specified above for multipiloted aircraft provided:

- (1) The assisting NFO is instrument qualified in accordance with this instruction and NATOPS qualified in the model aircraft in which NFO duties are being performed.
- (2) Cockpit configuration is such that the assisting NFO can:
  - (a) Monitor the pilot flight instruments
  - (b) Monitor and control communication
  - (c) Assist the pilot in acquiring the runway visually.

**5.3.4.4 Criteria for Continuing Instrument Approaches to a Landing.** Pilots shall not descend below the prescribed minimum descent altitude (MDA) or continue an approach below the decision height (DH) unless they have the runway environment in sight and in their judgment a safe landing can be executed, either straight-in or from a circling approach, whichever is specified in their clearance.

- a. Precision Approaches - A missed approach shall be executed immediately upon reaching the decision height unless the runway environment is in sight and a safe landing can be made. On precision radar approaches, the pilot may expect control instructions until over landing threshold; course and glidepath information given after decision height shall be considered advisory in nature.
- b. Non-precision Approaches - A missed approach shall be executed immediately upon reaching the missed approach point if visual reference is not established and/or a landing cannot be accomplished. If visual reference is lost while circling to land from a published instrument approach, the missed approach specified for that particular procedure must be followed. To become established on the prescribed missed approach course, the pilot should make an initial climbing turn toward the landing runway and continue the turn until he/she is established on the missed approach course.

**5.3.4.5 Final Approach Abnormalities During Radar Approaches.** The controller shall issue instructions to execute a missed approach or to climb and maintain a specific altitude and fly a specified course whenever the completion of a safe approach is questionable because one or more of the following conditions exist:

- a. Safe limits are exceeded or radical aircraft deviations are observed.
- b. Position or identification of the aircraft is in doubt.
- c. Radar contact is lost or a malfunctioning radar is suspected.
- d. Field conditions, conflicting traffic, or other unsafe conditions observed from the tower prevent approach completion.

**5.3.4.6 Execution of the Missed Approach**

- a. Execution of the missed approach by the pilot is not necessary for conditions a, b, or c above if the pilot has the runway or approach/runway lights in sight. In these cases, controller phraseology shall be: (reason). If runway/approach lights/runway lights are not in sight, execute missed approach (alternate instructions). Reasons may include radar contact lost, too high/low for safe approach, or too far right/left for safe approach.
- b. Execution of the missed approach is mandatory for condition d above. Controller phraseology is "Execute missed approach", and the reason for the order (i.e., Aircraft ahead of you has taken the arresting gear); or the controller may issue instructions to climb and maintain a specific altitude and fly a specified heading and the reason for such instructions.

**Note**

Pilots may execute a missed approach at their own discretion at any time.

**5.3.4.7 Practice Approaches.** The provisions of this section are not intended to preclude a single-piloted aircraft from executing practice approaches (no landing intended) at a facility where weather is reported below published minimums when operating with an appropriate ATC clearance. The facility in

question must not be filed destination or alternate and the weather at the filed destination and alternate must meet the filing criteria for an instrument clearance as set forth in this instruction.

**5.3.4.8 Tower/Approach Control Responsibilities.** A Navy or Marine Corps tower/approach control facility serving an airport shall keep the pilot informed of the latest reported weather and actual field conditions. Every effort shall be made to inform the pilot as well as the controller (in case of radar approaches) of the most current ceiling, runway visibility, surface wind, and runway conditions. That is particularly important during periods of rapidly changing weather conditions such as fog, snow, and other phenomena that reduce visibility and braking action.

#### Note

Certain naval air traffic controllers certified in accordance with the guidance contained in NATOPS Air Traffic Control Facilities Manual are authorized to record and disseminate changing tower visibility observations directly to the pilot when prevailing visibility is less than 4 miles.

## 5.4 HELICOPTER/TILT-ROTOR OPS

### 5.4.1 Helicopter/Tilt-Rotor Operations in Class B, C, or D Airspace

**5.4.1.1 Tower Clearance.** When operating within class B, C, or D airspace, either tower frequency or an appropriate control frequency shall be monitored at all times.

**5.4.1.2 Autorotations.** Practice autorotations shall be conducted within the limits of the field boundary over a surface upon which a full autorotation can be safely completed and that is readily accessible to crash, rescue, and firefighting equipment. Practice autorotations shall require the specific approval of the tower.

**5.4.1.3 Altitude.** Helicopter/tilt-rotor flights within class B, C, or D airspace shall be in accordance with the local Air Operations Manual. Where

no other guidance is provided, **pilots of helicopters and tilt-rotors (which are operated in conversion mode)** shall not exceed 500 feet AGL unless specifically cleared by the tower or other control agency. Pilots shall avoid flying over areas at altitudes where their rotor **or prop-rotor** wash could result in damage to aircraft, property, or personnel. **Tilt-rotors in airplane mode shall comply with fixed wing procedures.**

**5.4.1.4 Ground Operations.** Air taxi/ground operations shall be conducted with sufficient horizontal separation to preclude damage to aircraft, property, or personnel. Pilots shall operate with the minimum required power while on the ground and shall be particularly alert to prevent foreign object damage (FOD) and/or gust damage to their own and other aircraft.

**5.4.2 Helicopter/Tilt-Rotor Terrain Flight Operations.** Terrain flights (low level, contour, nap of the Earth (NOE)) shall be conducted only as operational necessity dictates, in training scenarios executed within designated training areas, or as published procedures and clearances prescribe.

**5.4.3 Helicopter/Tilt-Rotor Night Hover Operation Over Water.** Night/low visibility hover operations over water shall be conducted using aircraft equipped with operable automatic hover systems (i.e., coupler/Doppler/AFCS equipment) on all occasions when a natural horizon visible from the cockpit is not available to assist the pilot in establishing/maintaining a stable hover.

## 5.5 REDUCING FLIGHT-RELATED DISTURBANCES

**5.5.1 Annoyance to Civilians and Endangering Private Property.** Flights of naval aircraft shall be conducted so that a minimum of annoyance is experienced by persons on the ground. It is not enough for the pilot to be satisfied that no person is actually endangered. Definite and particular effort shall be taken to fly in such a manner that individuals do not believe they or their property are endangered. The following specific restrictions apply in view of the particularly unfavorable effect of the fear, extreme annoyance, and damage that can be inflicted.

**5.5.1.1 Noise Sensitive Areas.** Breeding farms, resorts, beaches, and those areas designated by the U.S. Department of Interior as national parks, national monuments, and national recreational areas are examples of noise sensitive areas.

**5.5.1.2 Noise Sensitive and Wilderness Areas.** These areas shall be avoided when at altitudes of less than 3,000 feet AGL except when in compliance with an approved:

- a. Traffic or approach pattern
- b. VR or IR route
- c. Special use airspace.

Noise sensitive areas shall be avoided in the development of IR and VR routes and additional special use airspace unless the 3,000-foot criteria can be observed.

**5.5.1.3 Aerial Refueling.** Aerial refueling over densely populated areas shall be avoided whenever possible.

**5.5.1.4 External Stores/Cargo.** Pilots carrying external stores/cargo shall avoid overflying populated areas whenever possible.

**5.5.1.5 Temporary Flight Restrictions.** Aircraft shall not be operated within an area designated by a NOTAM within which temporary flight restrictions apply except as permitted in FAR 91.137.

**5.5.1.6 Flat Hatting.** Flat hatting or any maneuvers conducted at low altitude and/or a high rate of speed for thrill purposes over land or water are prohibited.

## **5.5.2 Disturbance of Wildlife**

**5.5.2.1 General.** Commanding officers of aviation units shall take steps to prevent aircraft from frightening wild fowl or driving them from their feeding grounds. When it is necessary to fly over known wild fowl habitations, an altitude of at least 3,000 feet shall be maintained, conditions permitting. During hunting season, pilots shall avoid flying near wildlife haunts except as noted above.

**5.5.2.2 Firing.** Firing at large fish, whales, or any wildlife inhabiting the land or sea is prohibited.

**5.5.3 Zooming of Vessels.** Restrictions on zooming are not intended to hamper standardized shipping/ASW surveillance rigging and photography procedures as defined in appropriate fleet operating instructions.

**5.5.4 Avoidance of Commercial Carriers and Aircraft of Civil Registry.** At a minimum, such aircraft shall be avoided by a margin of at least 500 feet vertically or 1 mile laterally unless ordered otherwise by competent air traffic control authority. Under no circumstances shall aircraft be flown erratically or aerobatically in the close vicinity of civil aircraft. Civil aircraft carrying 10 or more passengers are equipped with Traffic Alert and Collision Avoidance System (TCAS). TCAS may activate when it detects an aircraft within 1,200 feet vertically, and 6 nm horizontally. If the passenger-carrying aircraft is not aware of the traffics intentions or does not have the traffic in sight, the passenger-carrying aircraft may take abrupt, evasive actions in response to a TCAS Resolution Advisory. This could cause injury to those on board the passenger-carrying aircraft. TCAS is activated by transponder when aircraft are squawking mode "S" or "C". TCAS provides a protected volume of airspace around an aircraft. The dimensions of this airspace are not based on actual distance but rather on the time to closest point of approach (CPA). Thus, the size of the protected volume depends on relative closure rate. Generally, the system begins to alert the flightcrew of a potential conflict when targeted aircraft are within 6 nm and 1,200 feet vertically of the TCAS-equipped aircraft. The system is designed to operate out to a maximum of 14 nm and identifies possible conflicting air traffic in three basic ways:

- a. Tracking TCAS alerts the crew to all targets (transponder equipped) within range of the TCAS equipment.
- b. Traffic Advisory (TA) TCAS declares a targeted aircraft an intruder. The flightcrew is alerted that vertical separation will be less than 1,200 feet at CPA.
- c. Resolution Advisory (RA) TCAS declares a targeted aircraft as a threat. The crew is commanded to change the altitude of their aircraft to provide vertical separation from the targeted aircraft.



**5.5.5 Avoidance of Installations Important to Defense.** Although a “special use airspace” designation has not been assigned to all ammunition depots, magazines, oil refineries, and other plants considered important to national defense, naval aircraft shall avoid flying over such areas when their location is known.

**5.5.6 Jettisoning Fuel.** Whenever practicable, fuel shall not be jettisoned (dumped) below an altitude of 6,000 feet above the terrain. Should weather or emergency conditions dictate jettisoning at a lower altitude, every effort shall be made to avoid populated areas. When under positive control, the pilot in command should advise the air traffic control facility that fuel will be jettisoned.

**5.5.7 Air-to-Air Missile Training Flights.** Aircraft carrying live missile components other than guidance and control heads are prohibited from utilizing piloted aircraft as targets for training unless all participants have been thoroughly briefed on the conduct of the flight.

#### **5.5.8 Expenditure of Airborne Stores Through Extensive Cloud Cover**

**5.5.8.1 Naval Commands.** Pilots of Navy and Marine Corps aircraft are only authorized to expend ordnance, fire missiles, or drop other airborne stores through cloud cover sufficiently extensive to preclude visual clearance of the air and surface area under the following conditions:

- a. When operating over the high seas, provided area air and surface clearance can be ensured through radar surveillance or visual means. The operational commander conducting the exercise is responsible for the safeguarding of airborne and surface traffic. The fact that the firing is conducted in a warning area or that a NOTAM has been issued does not relieve the operational commander of his/her responsibility.
- b. When operating over land (including over territorial waters), provided that the firing or drop is conducted within an activated restricted area and the impact is within a designated surface target/range. The restricted area controlling authority must specifically approve such usage and is responsible for coordination of airspace and target/range scheduling to ensure protection of other re-

stricted area users and target/range personnel. The operational commander conducting the exercise is responsible for ensuring the firing or drops are conducted in the specified airspace and impact the scheduled surface target/ range.

**5.5.8.2 Nonnaval Commands.** Nonnaval commands may be authorized to expend ordnance in restricted or warning area airspace for which Navy or Marine Corps commands are designated controlling authority, provided the criteria specified above are observed and the using service, by written agreement, assumes complete responsibility for any damages resulting from such use.

**5.5.8.3 Emergency Jettisoning.** Nothing in the above precludes emergency jettisoning of external stores through extensive cloud cover; pilots are directly responsible for their actions and must take every possible precaution to minimize danger to other aircraft and persons/property on the surface.

### **5.6 FLAMEOUT APPROACHES**

**5.6.1 Actual Flameout Approaches.** Actual flameout approaches shall not be attempted unless it is impossible/impractical to abandon the aircraft.

**5.6.2 Simulated Flameout Approaches.** Simulated flameout approaches are prohibited, unless specifically authorized by individual NATOPS manuals.

### **5.7 FLIGHT OPERATIONS WITH NIGHT VISION DEVICES**

**5.7.1 General.** NVDs greatly expand the capability and survivability of night tactical flight profiles flown against modern threats. Flying with NVDs is authorized for units and types of aircraft for which a valid requirement exists. Appropriate commanders shall ensure issuance of and adherence to specific instructions and standard operating procedures for all aspects of NVD flying.

#### **5.7.2 Operating Limitations**

- a. NVD operations using image-intensifying devices, such as AN/AVS-9, AN/AVS-6, or MXU-810/U (CATSEYEs), shall be conducted in VMC. Flight in IMC for purposes of conducting standard instrument departures and instrument approaches is permitted while under positive radar control.



Entering IMC during VFR training is prohibited. Inadvertent IMC procedures shall be briefed for all NVD flights.

b. Aircraft interior lighting should be NVD compatible to the maximum extent possible.

c. Aircraft exterior lighting shall comply with applicable FAA regulations unless exemptions have been approved. However, the anti-collision lights need not be lighted when the pilot in command determines that, because of operating conditions, it would be in the interest of safety to turn the lights off. In restricted areas, position lights of multi-aircraft flights of up to four aircraft on NVDs may fly with lead through dash threes navigation and anti-collision lights off. If applicable, formation and blade tip lights shall be on at the highest intensity consistent with NVD compatibility. The last aircraft in each flight shall have navigation lights on at the highest intensity consistent with NVD compatibility and anti-collision lights on.

d. Minimum illumination requirements shall be established by CNO/CMC for the conduct of NVD training flights/missions. **The approved methods of deriving illumination levels are the Solar/Lunar Almanac Program (SLAP) computer program or as determined by a CNO/CMC-approved study of the illumination level under various conditions. The SLAP Computer Program is available on the MAWTS-1 ([www.tediv.usmc.mil/mawts1](http://www.tediv.usmc.mil/mawts1)), NAVOCEANO ([www.navo.navy.mil](http://www.navo.navy.mil)) and SIPRNET Websites.** Illumination levels must be tempered with sound judgment and the effects of cloud cover, humidity, haze, dust, low moon angles, etc., considered. For characterization purposes, low light as used in Appendix H, page H-3, is defined as light level less than 0.0022 lux. Other than low light is defined as light level greater than or equal to 0.0022 lux.

e. NVD aircrews shall complete an approved NVD training syllabus and be certified by the commanding officer with a NATOPS flight qualification jacket entry for NVD operations. Training should include demonstrations of the limits to NVD capabilities imposed by environmental conditions and human factors. Attendance at a Night Imaging and Threat Evaluation (NITE) Lab is strongly recommended.

f. NVD instructors shall complete an approved NVD IUT training syllabus and be certified by the commanding officer with a NATOPS flight qualification jacket entry for NVD instructional flights.

g. NVD-designated aircrew shall meet currency requirements as specified in the individual aircraft NATOPS manual, functional wing directives, and/or the USMC Aviation Training and Readiness manual (MCO 3500.14). Qualification/currency requirements may vary for different mission areas, (i.e., shipboard operations, overland navigation, NOE navigation, strike rescue, etc.) and should be identified in the appropriate manual/instruction. Simulators may be used to support the training program, but shall not replace aircraft flight hour requirements.

h. For NVD training syllabus flights, the pilot in command (PIC) shall be current for the mission. For all other flights, both the PIC and copilot shall meet appropriate currency requirements.

i. Mixing different types of NVDs between aircrew within individual aircraft is not authorized. The use of AN/AVS-6 and MXU-810/U (CATEYES) within multiple aircraft flights is authorized.

j. Shipboard and ground operation involving groundcrews using NVDs shall be dictated by the platform NATOPS manual (i.e., CV NATOPS, **LHA/LHD/MCS NATOPS**) or the applicable NWP.

## 5.8 OPERATION OF UNMANNED AERIAL VEHICLES (UAVs)

**5.8.1 General Precautions.** The operation of UAVs shall be conducted with due consideration of the potential hazard presented when they are out of control. Whenever practicable, UAVs shall be operated at such an altitude and on such paths that danger to personnel and property on the surface is reduced to a minimum. In operating UAVs, due consideration shall be given to avoiding other aircraft in flight.

### 5.8.2 Specific Operating Limitations

a. In planning and conducting the flightpath to, in, and from operating areas, all activities operating UAVs shall select and adhere to those tracks and

altitudes that completely minimize the possibility of UAVs falling into a congested area in the event of electronic or material malfunction.

b. Aerobatics shall not be performed unless required for operational exercises of test or evaluation of operational designs.

**5.8.3 Displays and Demonstrations.** Participation of UAVs in public demonstrations, except for static display, is prohibited unless expressly authorized by CNO.

**5.8.4 Overall Use and Control.** Subject to the foregoing instructions and insofar as is practicable, the use and control of UAVs shall be the same as for piloted aircraft.